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PHILOSOPHICAL TRANSACTIONS.

Munday, June 5. 1665.

The Contents.

A Relation of some extraordinary Tydes in the West-Isles of Scotland, by Sr. Robert Moray. The judgment of Monsieur Auzout, touching the Apertures of Object-glasses, and their proportions in respect of the several lengths of Telescopes; together with a Table thereof. Considerations of the same Person upon Mr. Hook's New Engine for grinding of Optick-glasses. Mr. Hook's Thoughts thereupon. Of a means to illuminate an Object in what proportion one pleaseth; and of the distances, that are requisite to burn Bodies by the Sun. A further account by Monsieur Auzout of Signior Campani's Book, and Performances about Optick-Glasses. Campani's Answer thereunto; and Mr. Auzout's Animadversions upon that Answer. An account of Mr. Lower's newly published Vindication of Dr. Willis's Diatriba de Febris.

A Relation of some extraordinary Tydes in the West-Isles of Scotland, as it was communicated by Sr. Robert Moray.



IN that Tract of Isles, on the West of Scotland, called by the Inhabitants, the *Long-Island*, as being about 100. miles long from North to South, there is a multitude of small Islands, situated in a *Fretum*, or *Frith*, that passes between the Island of *Euß*, and the *Herris*; amongst which, there is one called *Berneray*, some three miles long, and

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more.

more than a mile broad, the length running from *East* to *West*, as the *Fritb* lyes. At the *East* end of this *Island*, where I stayed some 16. or 17. dayes, I observed a very strange Reciprocation of the Flux and Re-flux of the Sea, and heard of another, no less remarkable.

Upon the *West* side of the *Long Island*, the Tides, which came from the *South-west*, run along the Coast, *Northward*; so that during the ordinary course of the Tides, the Flood runs *East* in the *Fritb*, where *Berneray* lyes, and the Ebb *West*. And thus the Sea ebbs and flows orderly, some 4. days before the *full Moon*, and *change*, and as long after (the ordinary Spring-tides rising some 14. or 15. foot upright, and all the rest proportionably, as in other places) But afterwards, some 4. days before the *Quarter moons*, and as long after, there is constantly a great and singular variation. For then, (a *Southerly* Moon making there the full Sea) the course of the Tide being *Eastward*, when it begins to flow, which is about $9\frac{1}{2}$ of the Clock, not onely continues so till about $3\frac{1}{2}$ in the afternoon, that it be high water, but, after it begins to ebb, the Current runs on still *Eastward*, during the whole Ebbs so that it runs *Eastward* 12 hours together, that is, all day long, from about $9\frac{1}{2}$ in the morning, til about $9\frac{1}{2}$ at night. But then, when the night-Tide begins to flow, the Current turns, and runs *Westward* all night, during both Flood & Ebb, for some 12. hours more, as it did *Eastward* the day before. And thus the Reciprocations continue, one Flood and Ebb, running 12. hours *Eastward*, and another twelve hours *Westward*, till 4. days before the *New* and *Full Moon*; and then they resume their ordinary regular course as before, running *East*, during the six hours of Flood, and *West*, during the six of Ebb. And this I observed curiously, during my abode upon the place, which was in the Moneth of *August*, as I remember.

But the Gentleman, to whom the *Island* belongs at present, and divers of his Brothers and Friends, knowing and discreet persons, and expert in all such parts of Sea-matters, as other *Islanders* commonly are, though I shrewdly suspected their skill in Tides, when I had not yet seen what they told me, and I have now related of these irregular Courses of the Tides, did most confidently assure me, and so did every body I spake with
about

about it, that there is yet another irregularity in the Tides, which never fails, and is no less extraordinary, than what I have been mentioning: which is, That, whereas between the *Vernal* and *Autumnal Equinoxes*, that is, for six Moneths together, the Course of irregular Tides about the Quartermoons, is, to run all day, that is, twelve hours, as from about $9\frac{1}{2}$ to $10\frac{1}{4}$, $10\frac{1}{4}$ to $10\frac{3}{4}$ &c. *Eastward*, and all night, that is, twelve hours more, *Westward*: during the other six Moneths, from the *Autumnal* to the *Vernal Equinox*, the Current runs all day *Westward*, and all Night *Eastward*.

Of this, though I had not the opportunity to be an Eye-witness, as of the other, yet I do not at all doubt, having received so credible Information of it.

To penetrate into the *Causes* of these strange Reciprocations of the Tides, would require exact descriptions of the Situation, Shape, and Extent of every piece of the adjacent Coasts of *Euſt* and *Herris*; the Rocks, Sands, Shelves, Promontorys, Bays, Lakes, Depths, and other Circumstances, which I cannot now set down with any certainty, or accurateness; seeing, they are to be found in no *Map*, neither had I any opportunity to survey them; nor do they now occur to my Memory, as they did some years ago, when upon occasion I ventured to make a *Map* of this whole *Friſh* of *Berneray*, which not having copied, I cannot adventure to beat it out again.

Monſieur Auzout's Judgment touching the Apertures of Object-Glaſſes, and their Proportions, in reſpect of the ſeveral Lengths of Telescopes.

This Author, observing in a small *French Treat* lately written by him to a Countryman of his, Monsieur *L' Abbe Charles*; That great *Optick Glaſſes* have almost never as great an *Aperture* as the small ones, in proportion to what they Magnifie, and that therefore they must be more dim; takes occasion to inform